

Human exposure to fluoride in Derbyshire, UK

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Fluoride is recommended as an essential element to promote healthy bone growth and prevent dental caries. In excess amounts fluoride can cause detrimental effects such as dental fluorosis, mottling of teeth and skeletal and crippling fluorosis. The main sources of fluoride in the human diet are fluoridated water, food prepared in fluoridated water, tea, marine fish, and fluoridated dental products. The adequate daily dietary intake of fluoride is 4 and 3 mg/day for adult men and women respectively, with a tolerable upper intake of 10 mg/day (USA, National Academy of Sciences, 2009). Estimates suggest that 75% of dietary fluoride is from water and water-based beverages (USDA, 2004). The present study aims to assess human exposure to fluoride in the Derbyshire area of the UK and evaluates drinking water fluoridation of this region. This is achieved through studies on

the determination of fluoride in the Derbyshire environment (surface water, soil, vegetation) including its fluorspar mining area, and human intake of fluoride from dietary sources such as drinking water and tea beverage. The findings of this study show that compared to normal background concentrations, the Derbyshire environment is enriched in fluoride in its soil, surface water and vegetation, and this is particularly high in the fluorspar mining area of the county. This provides a higher risk of fluoride into the human food chain in this area. An estimate of fluoride intake through the drinking of household tap water and tea shows that these sources alone can provide the daily adequate dietary intake of fluoride to the Derbyshire population, and hence questions the blanket fluoridation of water supplies of this region.

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